28450
Z/038/61/000/010/002/008
D291/D301

Tasks of nuclear physics ...

temperature of liquid helium can be started late in 1961. There are 14 figures and 15 Soviet-bloc references.

ASSOCIATION: Ústav jaderného výzkumu ČSAV, Řež (Nuclear Research Institute Czechoslovak AS, Řež)

Card 6/6

BEM, Pavel; HABANEC, Josef; KARBAN, Oldrich; NEMEC, Jan

Measurement of proton polarization in elastic scattering on carbon. Jaderna energie 8 no.3:96-97 Mr '62.

Z/055/62/012/009/002/003
I046/I246

AUTHORS Bém, P., Habanec, J. I., Karban, O. and Němec, J.

TITLE Polarization of protons scattered elastically on carbon

PERIODICAL Chekhoslovatskiy fizicheskiy zhurnal, v. 12, no. 9, 1962, 660–664

TEXT The polarization of protons scattered elastically on two carbon targets was measured for a cyclotron proton beam accelerated to 6.5 MeV. The angular distribution in the energy interval from 3.60 to 4.52 MeV was as follows: $P(40°_{lab}) = 0.30 \pm 0.05$; $P(45°_{lab}) = 0.36 \pm 0.07$, $P(50°_{lab}) = 0.33 \pm 0.06$, $P(60°_{lab}) = 0.20 \pm 0.05$. The results after scattering on one target are in good agreement with those given by Warner R. E. and Alford W. P. (Ref. 6: Phys. Rev., 114 (1959), 1338). There are 4 figures and 1 table.

ASSOCIATION Institut yadernykh issledovaniy ChSAN (Institute of Nuclear Research Czechoslovak AS, Rzhezh)

SUBMITTED October 20, 1961

Card 1/1

BEM, P.; HABANEC, J.; KARBAN, O., NEMEC, J., PRESPERIN, V.

Polarization measurement of protons with 6,7 MeV energy scattered on carbon. Chekhosl fiz zhurnal 14 no. 6:404-410 '64.

1. Institute of Nuclear Research Czechoslovak Academy of Sciences, Rez.

BFM P.; HA[illegible]

Measurement [illegible] (pp) $\delta^{1/2}$ [illegible] MeV range energy [illegible] 14 mg/cm² [illegible].

1. Inst[illegible] Rez.

L 18527-66 EWT(m)/EWA(h)

ACC NR: AP6010229 SOURCE CODE: CZ/0038/65/000/004/0144/0144

AUTHOR: Rem, Pavel; Habanec, Josef--Gabanets, Y.; Karban, Oldrich; Nemec, Jan--Nemets, Y.; Presperin, Vlastislav

ORG: Institute of Nuclear Research, CSAV, Rez (Ustav jaderneho vyzkumu CSAV)

TITLE: Measurement of the angular distribution of the polarization of protons in the reaction C-12 (p, p) C-12 in the energy region of 6.0 - 6.8 Mev

SOURCE: Jaderna energie, no. 4, 1965, 144

TOPIC TAGS: proton polarization, elastic scattering, angular distribution, cyclotron, silicon, carbon, particle detector, particle accelerator target

ABSTRACT: INR Report No. 1064/64, published in Jaderna Energie only as Czech and Russian summaries (modified): The angular distribution of the proton polarization during elastic scattering was measured at six values of the energy in the region of 6.0-6.8 Mev. The energy source was the INR 120-cm cyclotron at Rez. The energy of the protons was reduced by means of aluminum and carbon films. The degree of polarization of the scattered protons was determined by the right-left asymmetry of the secondary scattering on the carbon target of the analyzer. The particles were registered by silicon detectors with a surface barrier. The results of the

Card 1/2

work substantially supplement the individual data of other authors. At the present time the obtained data are being analyzed on the basis of the characteristics of the levels of the N-13 nuclei. [JPRS]

SUB CODE: 20 / SUBM DATE: none

 UDC: 539.171.018: 539.172.12: 546.26.02

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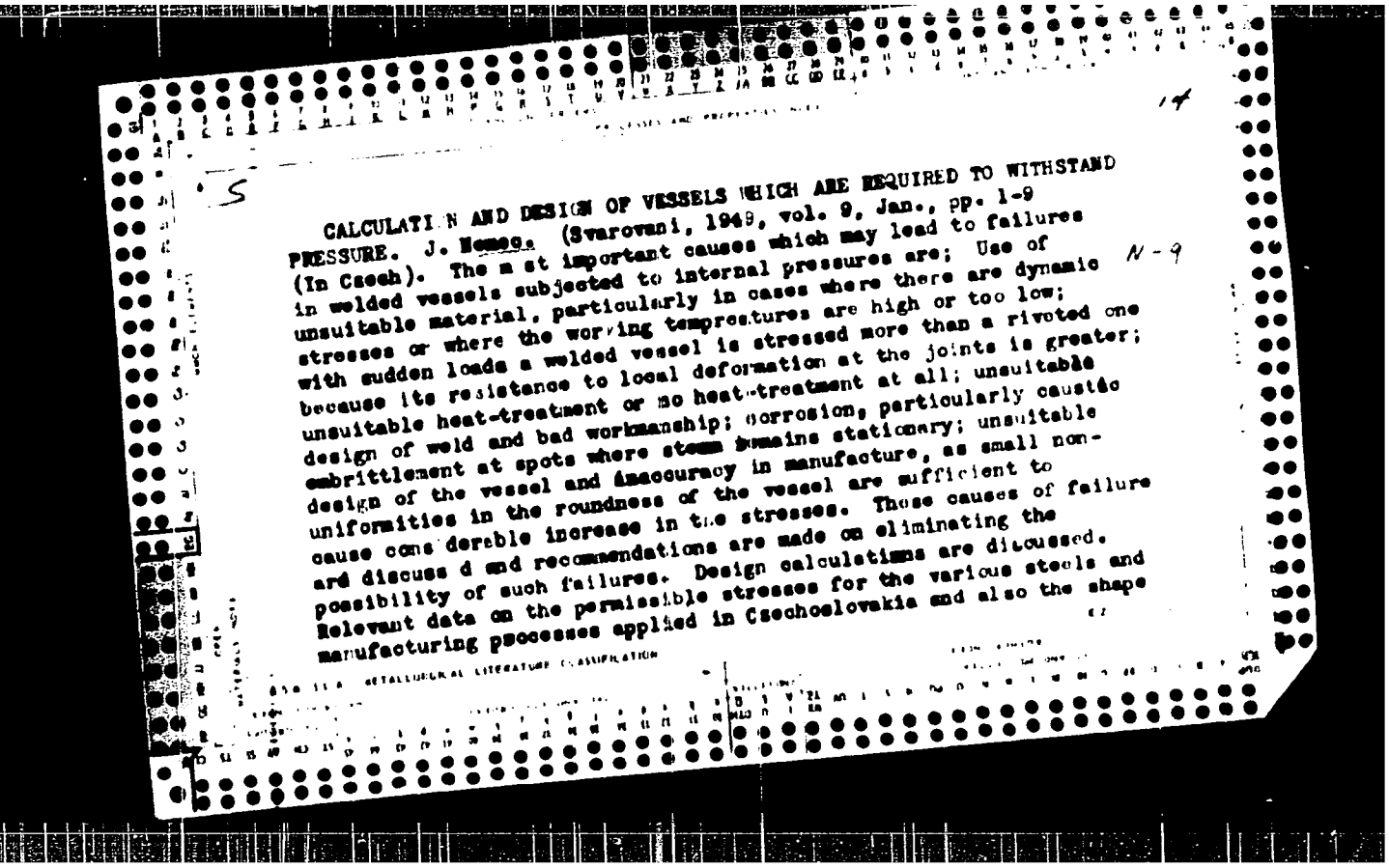


14

S

CALCULATION AND DESIGN OF VESSELS WHICH ARE REQUIRED TO WITHSTAND PRESSURE. J. Nemec. (Svarovani, 1949, vol. 9, Jan., pp. 1-9 (In Czech). The most important causes which may lead to failures in welded vessels subjected to internal pressures are; Use of unsuitable material, particularly in cases where there are dynamic stresses or where the working temperatures are high or too low; with sudden loads a welded vessel is stressed more than a riveted one because its resistance to local deformation at the joints is greater; unsuitable heat-treatment or no heat-treatment at all; unsuitable design of weld and bad workmanship; corrosion, particularly caustic embrittlement at spots where steam remains stationary; unsuitable design of the vessel and inaccuracy in manufacture, as small non-uniformities in the roundness of the vessel are sufficient to cause considerable increase in the stresses. These causes of failure are discussed and recommendations are made on eliminating the possibility of such failures. Design calculations are discussed. Relevant data on the permissible stresses for the various steels and manufacturing processes applied in Czechoslovakia and also the shape

N-9

METALLURGICAL LITERATURE CLASSIFICATION

NEMEC, J.

"Analysis of stresses in nonhomogeneous grains." Strojirenstvi, Praha, Vol. 4, No. 7, July 1954, p. 505.

SO: Eastern European Accessions List, Vol. 3, No. 11, Nov. 1954, L.C.

Nemec, J.

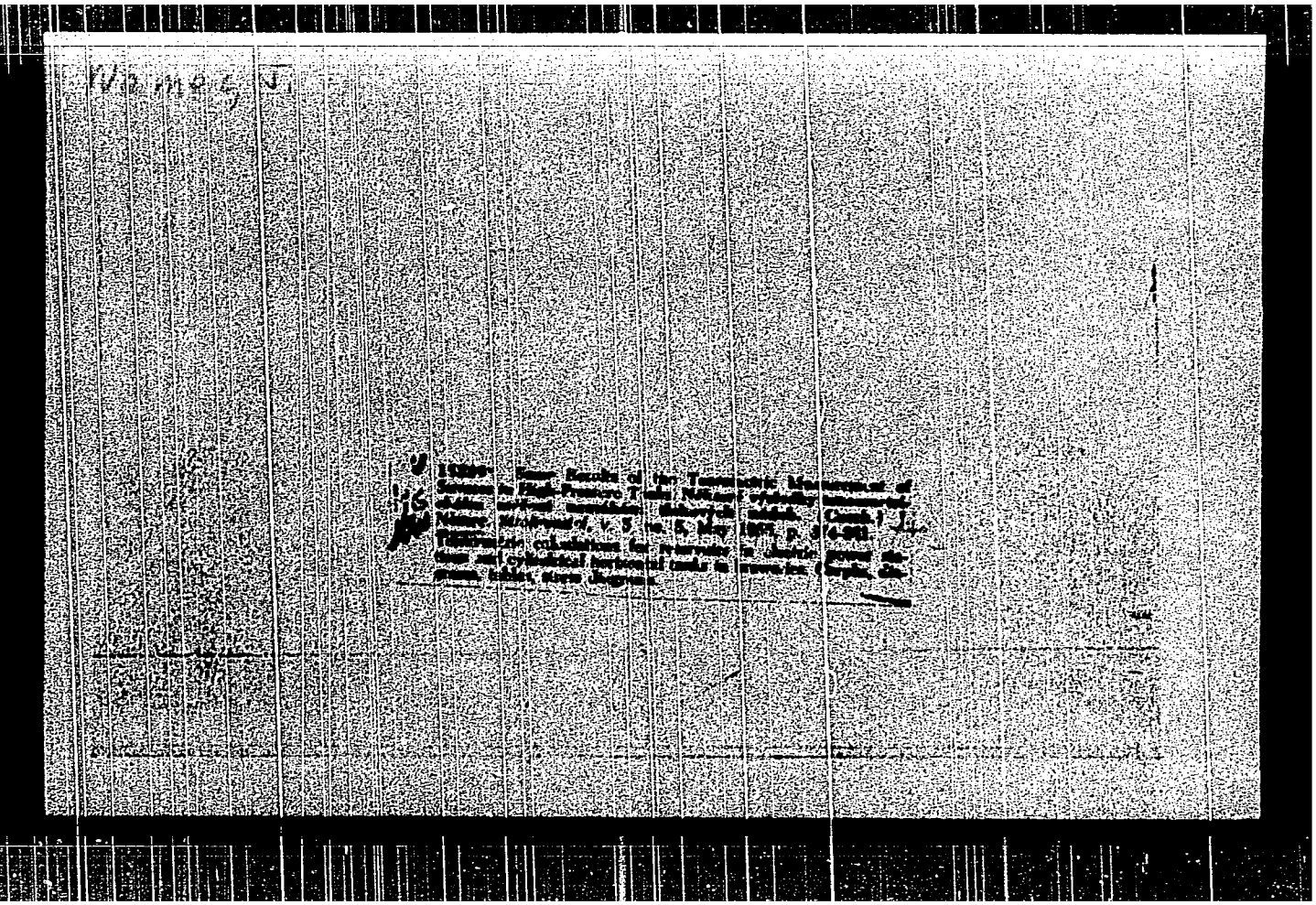
Powder cutting of high-alloy steels. p. 285. HUTNIK. (Ministerstvo hutniho prumyslu a rudnych dolu) Praha. Vol. 4, no. 9, Sept. 1954. Mechanical removal of waste from wire of low-carbon steel. p. 286.

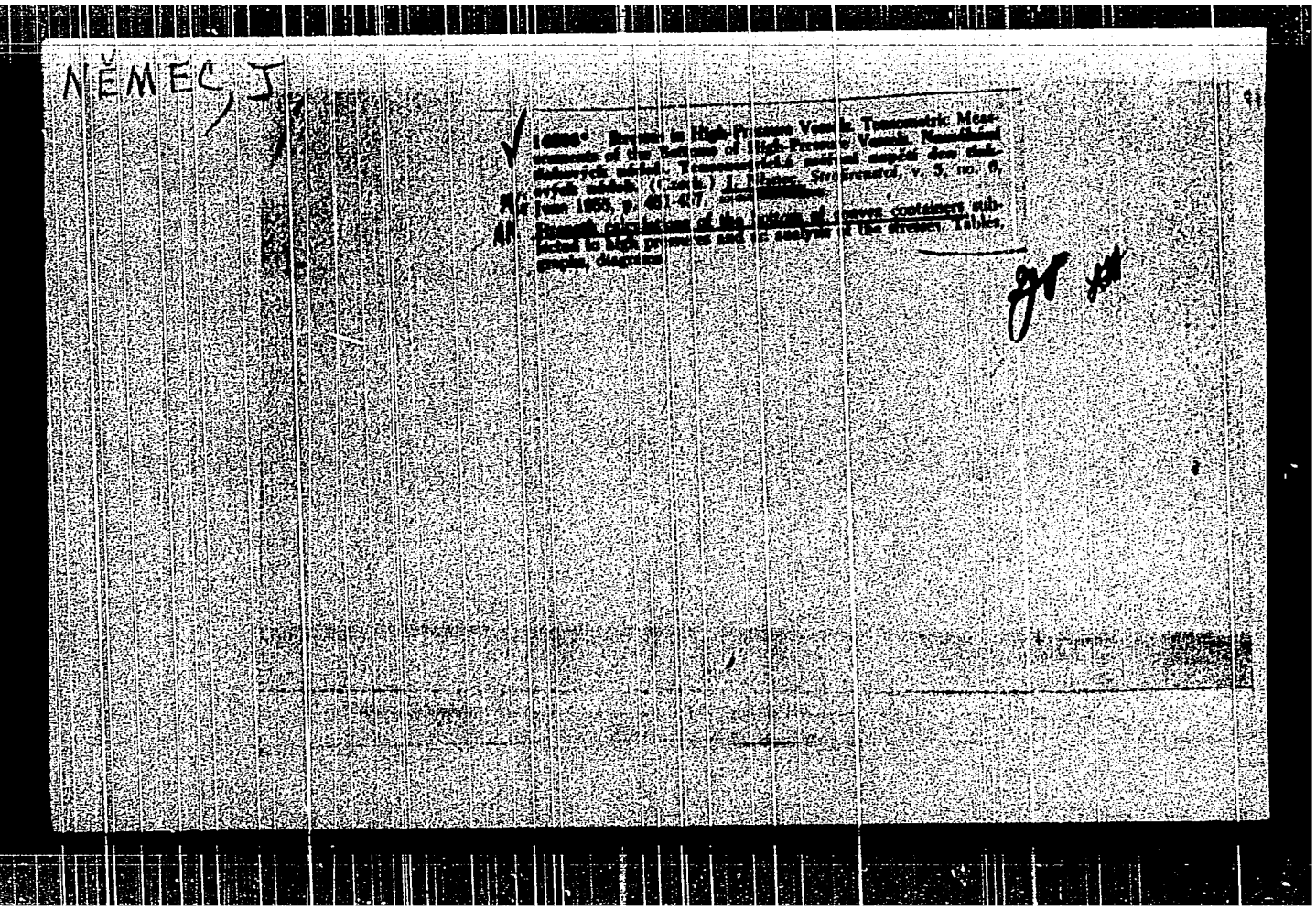
Source: EEAL LC Vol. 5, No. 10 Oct. 1956

NEMEC, J.

Zednik, V. Testing impact ductility, p. 766.
STROJIRENSTVI, Prague, Vol. 4, no. 10, Oct. 1954.

SO: Monthly List of East European Accessions, (EEAL), LC, Vol. 5, No. 6, June 1956, Uncl.





NEMEC, J.

Strain on vessels with rotary asymmetric necks, p. 538, STROJIRENSTVI (Ministerstvo strojirenstvi) Praha, Vol. 5, No. 7, July 1955

SOURCE: East European Accessions List (EEAL) Library of Congress, Vol.4, No. 12, December 1955

NEMEC, J.

Calculating the cutting effect of a v-shaped joint of a pressed-in hub. p. 2.
(Strojirenstvi, Vol. 6, No. 1, Jan 1956, Praha, Czechoslovakia)

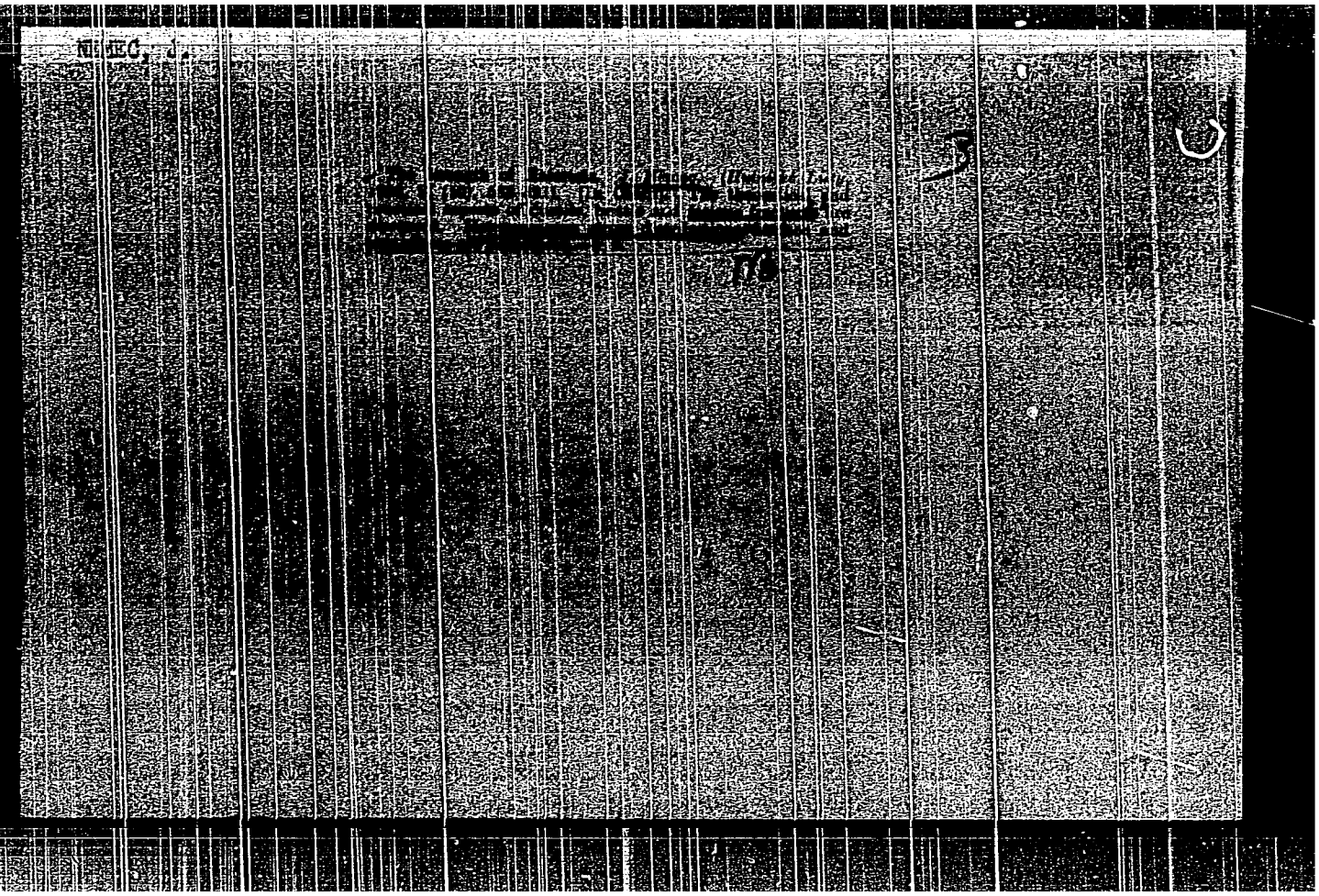
SO: Monthly List of East European Accessions (EEAI) LC, Vol. 6, No. 8, Aug 1957. Uncl.

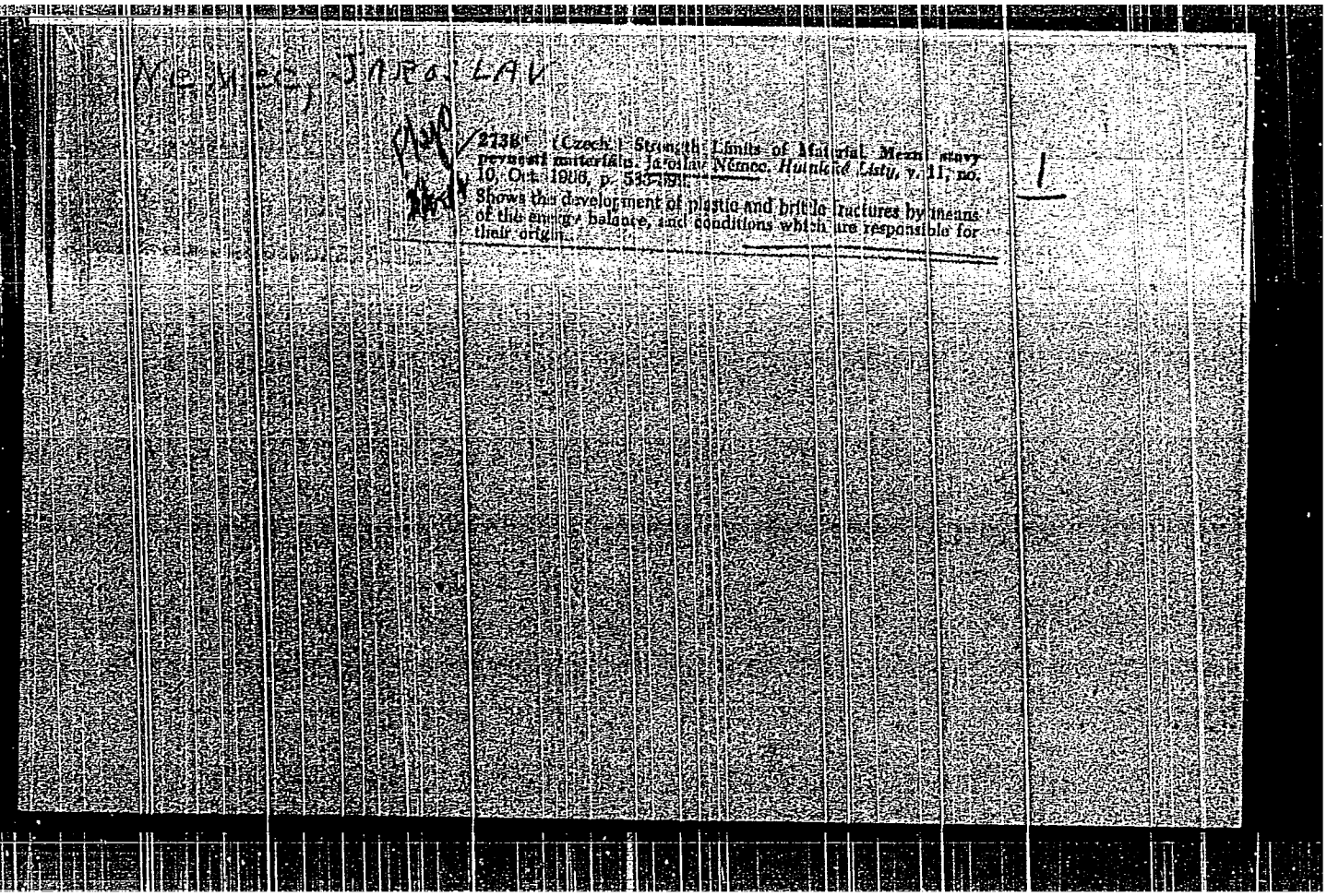
Nemec, J.

Nemec, J. Influence of the size of a spare part on its solidity. p. 257.

Vol. 7, no. 5, 1956
STROJNOELEKTROTECHNICKY CASOPIS
TECHNOLOGY
Czechoslovakia

So: East European Accessions, Vol. 6, May 1957
No. 5





NE-MEC-3 JAN 61 LAW

2738 (Czech. Strength Limits of Material. Mezni stavy pevnosti materialu. Jaroslav Nemec. *Hutnicke Listy*, v. 11, no. 10, Oct. 1956, p. 733-737.

Shows the development of plastic and brittle fractures by means of the energy balance, and conditions which are responsible for their origin.

NEMEC, J.

Measuring the pressure of presses. p. 227. (Strojirenstvi, Vol. 7, No. 3, Mar 1957, Praha, Czechoslovakia)

SO: Monthly List of East European Accessions (EEAL) LC, Vol. 6, No. 8, Aug 1957, Uncl.

NEMEC, J.

Improvement of calculation methods is a prerequisite for reducing the weight and increasing the dependability of machinery and constructions. p. 321.
(Strojirenstvi, Vol. 7, No. 5, May 1957, Praha, Czechoslovakia)

SO: Monthly List of East European Accessions (EEAL) LC, Vol. 6, No. 8, Aug 1957. Uncl.

NEMEC, J.

Effect of the shape of steel parts on heat stress relaxation. p. 403.

(Strojirenstvi. Vol. 7, no. 6, June 1957. Praha, Czechoslovakia)

SO: Monthly List of East European Accessions (EEAL) LC, Vol. 6, no. 10, October 1957. Uncl.

[redacted], J.

Use of new theoretical and experimental methods in designing machinery.

[redacted] (STROJIRENSTVI) (Praha, Czechoslovakia) Vol. [redacted], No. 12, Dec. 1957

Source: Monthly Index of East European Accession (MEAI) LC Vol. 7, No. 5, 1958

[illegible], J.

Dynamic strength of rolling stock under combined varying stresses.

[illegible]. 883. (STROJNICKY CASOPIS) Prague, Czechoslovakia) Vol. 7, no. 12, Dec. [illegible]

SO: Monthly Index of East European Accessions (EEAI) LC Vol. 7, no. 5, [illegible]

NEMEC, J.

CZECHOSLOVAKIA/Solid State Physics - Mechanical Properties of Crystals and Poly-Crystalline Compounds E-9

Abs Jour : Ref Zhur - Fizika, No 1, 1958, 1102

Author : Nemec, Jaroslav

Inst : Higher School for Iron Working, Prague, Czechoslovakia

Title : Plastic Stressed State in Steels.

Orig Pub : Hutniche listy, 1957, 12, No 4, 315-324

Abstract : The author considers the processes that precede the destruction of the adhesion forces in deformed steels, and raises the problem of the possibility of calculating the plastic stressed state in inhomogeneous materials. An investigation is made of the dependence of the static strength of steel on the fundamental physical properties that characterize the deformation of the ferrite. The mathematical foundations and deductions of the theory of

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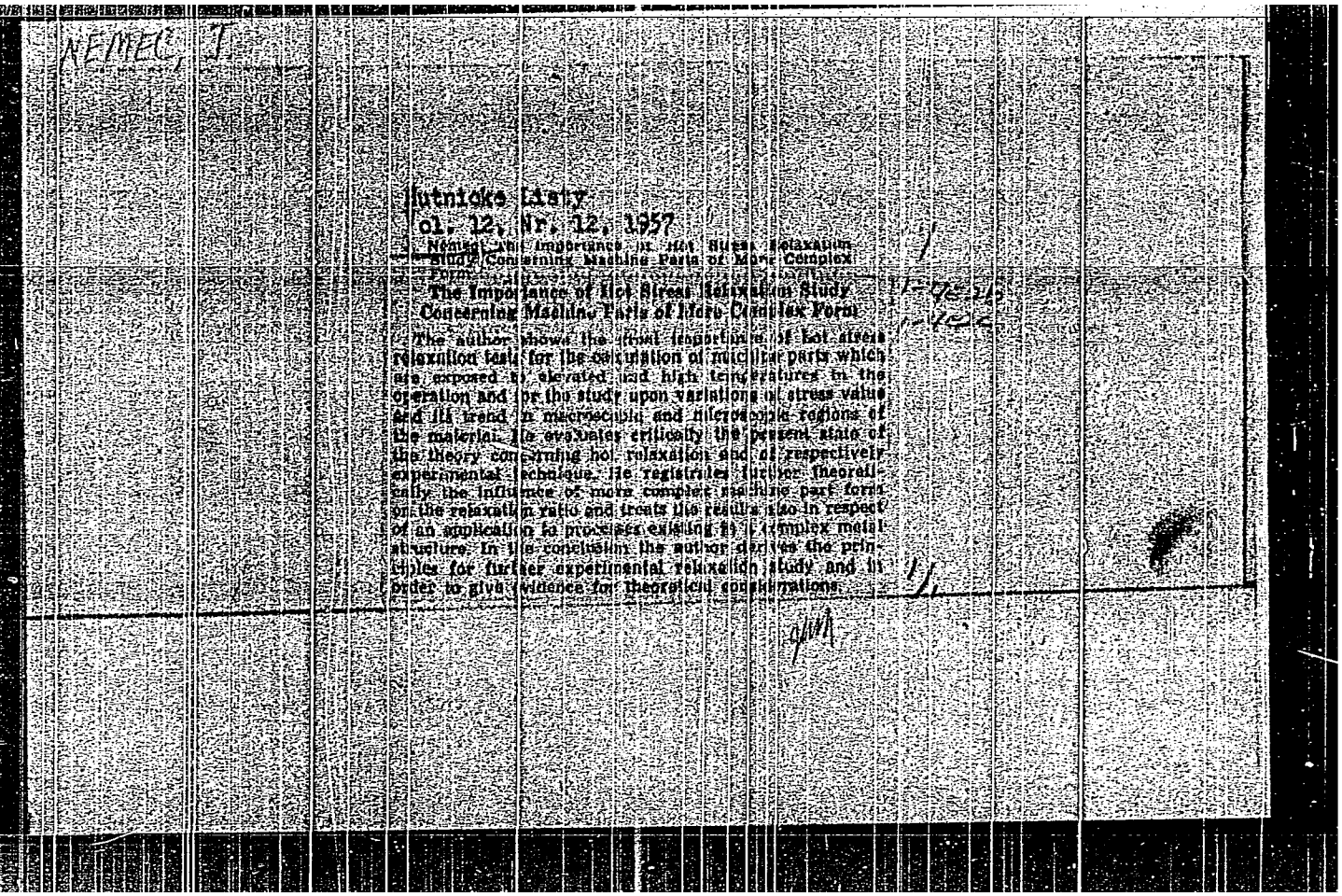

NEMEC, J.

Kutnicke listy
Ol. 12, Nr. 12, 1957

Nemec, J. Importance of Hot Stress Relaxation Study Concerning Machine Parts of More Complex Form. [illegible]

The Importance of Hot Stress Relaxation Study Concerning Machine Parts of More Complex Form

The author shows the great importance of hot stress relaxation test for the estimation of machine parts which are exposed to elevated and high temperatures in the operation and for the study upon variations of stress value and its trend in macroscopic and microscopic regions of the material. He evaluates critically the present state of the theory concerning hot relaxation and of respectively experimental technique. He registrates further theoretically the influence of more complex machine part form on the relaxation ratio and treats the results also in respect of an application to processes existing in complex metal structure. In the conclusion the author derives the principles for further experimental relaxation study and in order to give evidence for theoretical considerations.

NEMEC, J

NEMETS, Ya. [Nemec, J.]

Limit of brittle strength under various load conditions.
Izv. vys. ucheb. zav.; mashinostr. no.11/12:51-80 '58.
(MIRA 13:3)

1. Prazhskiy zheleznodorozhnyy politekhnicheskiy institut.
(Metals--Brittleness)

NEMEC, J.

TECHNOLOGY

periodicals: HUTNICKE LISTY Vol. 13, no. 12, Dec. 19[illegible]

NEMEC, J. Theory of the strength limits of steels. p. 1111.

Monthly List of East European Accessions (EEAI) LC Vol. 8, no. 5 May 1959, unclass.

NEMETS, Yaroslav [Nemec, Jaroslav], prof., doktor tekhn.nauk (Chekhoslovakiya)

Selecting admissible stresses in high-pressure pipes used in hydroelectric power stations. Vest.mash. 38 no.12:3-7 D '58. (MIRA 11:12)

(Pipes) (Strains and stresses)

NEMEC, J.

"Effect of shape, machining, and heat on the values of allowed strains in parts." p. 409.

STROJIRENSTVI. (MINISTERSTVO TEZKEHO STROJIRENSTVI, MINISTERSTVO PRESNEHO STROJIRENSTVI A MINISTERSTVO AUTOMOBILOVEHO PRUMYSLU A ZEMEDELSKYCH STROJU.) Praha, Czechoslovakia, Vol. 9, no. 6, June 1959.

Monthly List of East European Accessions (EEAI), LC, Vol. 8, No. 9, September 1959. Uncl.

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A201/A026

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AUTHOR: Němec, Jaroslav

TITLE: Strength of Nuclear Reactor Vessels /9

PERIODICAL: Jaderná energie, 1960, No 8, pp. 254 - 266

TEXT: The article presents an analysis of strength limits of large reactor pressure vessels. The analysis was undertaken in preparation of the designing of the pressure vessel for the first Czechoslovak nuclear power station. In particular, the article investigates the correlation between vessel size and radiation concentrations; the brittle strength of the vessel; the influence of thermal stresses on the vessel strength; and the influence of cyclic stresses on the service life of the vessel. Relations are deducted for the calculation of the shape strength of the vessel and for the determination of limit stresses leading to the development of sudden critical ruptures. The pressure vessel of the Czechoslovak nuclear power station will be produced of Type 13030 fine-grained steel. For this steel type, the critical integrated neutron flux at which the vessel material brittleness will reach a non-permissible value is estimated to be about $5 \cdot 10^{18}$. This value just about approaches the upper limit of the in-

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tegrated neutron flux of 10^{18} - 10^{21} to which the vessel will be exposed during a 30-year operation at an expected instantaneous neutron flux of 10^{9} - 10^{12} neutrons/cm^2/sec. Therefore, a better thermal shield will have to be designed, especially since the temperature range, at which the damaging effects of the neutron flux for this steel type are most pronounced, is between 100 and 200°C, which is exactly the temperature range at which the vessel of the Czechoslovak nuclear power station is designed to operate. From the above analyses, the following directions for reactor pressure vessel design and fabrication are deducted: 1) In designing and calculating the strength of reactor vessels it has to be considered that during long-term operation the plastic properties of the material will deteriorate and the limit-stress value at which cohesion defects start developing will gradually decrease. The extent of these unfavorable property changes will increase with the increasing wall thickness, integral neutron flux and stress concentrations; with more frequent and extensive changes of pressure and temperature; and with more numerous incipient material defects. 2) Static properties of material, as established by conventional test methods on small specimens, do not provide a satisfactory basis for the calculation of safety factors in reactor vessel design. 3) The stress-concentration and notch effects will increase with the increasing thickness of the vessel wall. 4) The effect of cyclic stresses will be the greater the more brittle is the material

Strength of Nuclear Reactor Vessels

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and the more complicated the vessel shape. 5) In stress calculation, due consideration is to be given to the internal and thermal stresses to which the vessel will be exposed. 6) The calculation of the permissible stress and stress-concentrations is a complex problem which cannot be solved by a mere extrapolation of experience gained with thin-walled pressure vessels of smaller sizes 7) Prior to the full-scale operation a series of verifying measurements and tests will have to be carried out in order to determine the actual safety of the vessel. There are 20 figures, 1 photo and 24 references: 9 Czechoslovak, 2 Soviet, 11 English and 2 Unidentified.

ASSOCIATION: Vysoká škola železniční (Railroad College)

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PHASE I BOOK EXPLOITATION CZECH/5191

Němec, Jaroslav, Professor, Engineer, Doctor of Sciences

Tuhost a pevnost ocelových částí (Rigidity and Strength of Steel Parts) Prague, Nakl. Československé akademie věd, 1961. 567 p. 1,500 copies printed.

Sponsoring Agency: Československá akademie věd. Sekce technická.

Scientific Ed.: Jaroslav Kožešník, Academician; Scientific Reviewers: Ladislav Jeníček, Professor, Doctor, Engineer, and Ondřej Puchner, Professor, Engineer, Doctor of Sciences; Ed. of volume: Antonín Burda; Tech. Ed.: František Končický.

PURPOSE: This book is intended for technical personnel concerned with research, development, and production in the machine industry.

COVERAGE: The following questions concerning steel parts and constructions are discussed: fractures, deformation processes, theory of plasticity, endurance at elevated temperatures, brittle

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fracture, and fatigue strength. The author thanks J. Kožešník, L. Jeníček, and O. Puchner for their advice and editorial assistance. There are 266 references: 71 Czech or Slovak, 46 Soviet, 102 English, 36 German, 3 French, 2 Polish, 1 Rumanian, and 5 others.

TABLE OF CONTENTS:

Jaroslav

NEMETS, Yaroslav [Nemec, J.] (Praga)

Brittle fracture of steel parts. Izv.AN SSSR.Otd.tekh.nauk.Mekh.i mashinostr. no.2:5-16 Mr-Ap '61. (MIRA 14:4)
(Steel—Brittleness)

Z/038/62/000/004/002/006
D291/D301

AUTHOR: Němec, Jaroslav

TITLE: Development of material cracks in an inhomogeneous field of internal stresses

PERIODICAL: Jaderná energie, no. 4, 1962, 117 - 121

TEXT: The article investigates the laws governing the development of cracks in bodies with a nonuniform distribution of residual stresses featuring high local-stress concentrations. The purpose of the study is to provide a tool for analyses of crack-formation, due to fabrication processes, so as they may be eliminated by selecting proper technological processes (heat treatment, welding methods) which are compatible with the strength of the bodies. Two basic causes of plane stress caused in a thin slab by rotationally-symmetrical deformation effects (spot welds or local flame heating), and by a longitudinal stress field of parabolic shape (internal stresses in longitudinal welds or thin walls or longitudinal material defects) respectively,

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D291/D301

Development of material cracks ...

are investigated. It is found that the ratio of the critical length of the crack or defect to the dimensions of the region of tensile stress plays an important part. Also, the condition of crack lability is defined. The study is of importance for determining the dangerousness of cracks in relation to the dimensions of the area affected by internal tensile stresses, and may find application especially in the new fabrication techniques of extra-large bodies. There are 5 figures (Technical Editor: V. Horák).

ASSOCIATION: Fakulta technická a jáderné fyziky ČVUT, Praha (Department of Technical and Nuclear physics, Czech Institute of Technology, Prague)

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24285
Z/032/61/011/008/004/009
E073/E535

188200 also 2807

AUTHOR: Němec, J., Professor Engineer Doctor of Science

TITLE: Evaluation of creep test data

PERIODICAL: Strojírenství, 1961, Vol.11, No.8, pp.613-616

TEXT: In evaluating the scatter of results relating to creep tests, attention is paid not only to determining the average probable values but also to the possibility of determining the minimum values. It is thereby not possible to use the symmetrical law of distribution of the values according to the Gauss curve, since the application of this law would mean that the occurrence of the limit state can never be excluded with absolute reliability. Use of this law would also be contrary to the conceptions of the dislocation theory of creep. For homogeneous creep the real distribution curve is more likely to be the one in dashed lines of Fig.1, since the limit state cannot be achieved under certain minimum stress and minimum testing time. Since in real components creep under normal conditions is usually the simultaneous result of two methods of creep, a more complicated characteristic can be anticipated, namely, that shown by the dash-dot curve in Fig.1.

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Therefore, analyses based on the Gauss law of distribution give results which are doubtful. Of still greater importance is the fact that excessively simplified relations between time Θ, stress σ and temperature T are applied, without taking into consideration geometrical factors and stress distribution. The results are frequently applied to the calculation of components using particularly the Larson-Miller equation, which is an empirical one and does not take into consideration the real conditions pertaining to creep in polycrystalline metals and alloys. It is pointed out that the speed of creep is not constant and it decreases with loading time. This conclusion is true even for smooth specimens, for which, according to R. Pokorny, the reviewer of this article, the dependence of the creep speed on time is complicated (the actually measured results for one Czech steel are given). The standard method is particularly inapplicable for parts of complicated shape, since the dependence of the creep speed on the loading time is clearly a function of the geometrical shape and its stress state. The physical process of creep should be subdivided into two phases; in the first the creep speed decreases

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Evaluation of creep test data

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E073/E535

as a result of equalization of stress peaks, in the second large plastic deformationsoccur (not taking into consideration tertiary creep), which result in changes in the shape of the body,thus generatinginternal stresses, which in turn lead to an increase in the creep speed. The author concludes that correct calculation of the strength and rigidity of machine parts operating under conditions of creep has to be done on the basis of the following principles: a) the creep and creep strength tests should not be carried out on smooth specimens but on sections subjected to bending stresses and on tubes which are subjected to internal pressures or on bodies which are subjected to combined stresses. Calculated values are given for a concrete case in which the creep results of a smooth specimen (tyc) are compared with those obtained for a tube (trubka) and a section (nosnik), Fig.7 (ε,%/hour vs. Θ, hours). b) Extrapolation should not be made on the basis of Larson-Miller or Kauzmann formulae; geometrical factors and changes in creep speed should be taken into consideration. c) More exhaustive studies should be made of stress relaxation processes. There are 9 figures and 2 references: 1 Czech and 1 English: Rimrott, F.P.J., Journal of Applied Mechanics, ASME, series E6.1959.

Card 3/4

24285

Evaluation of creep test data

Z/032/61/011/008/004/009
E073/E535

ASSOCIATION: VŠD, Prague

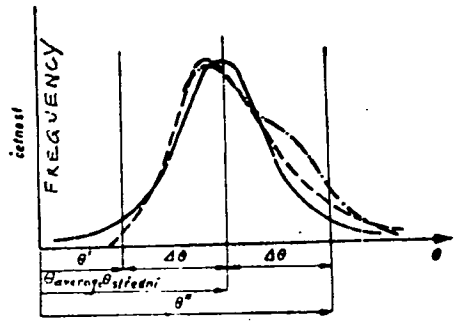

Fig.1

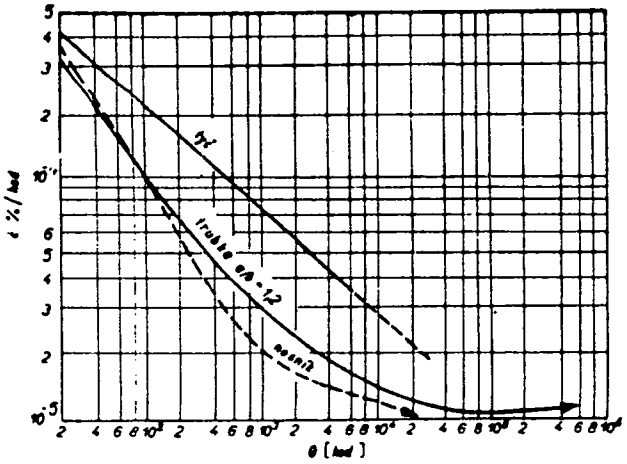

Fig.7

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26729
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E073/E635

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AUTHOR: Němec, J., Professor, Engineer, Doctor of Science, (Prague)

TITLE: Limit-strength states of large machine parts and vessels stressed at low temperatures

PERIODICAL: Strojírenství, v.12, no. 1, 1962, 11-15

TEXT: Sudden brittle fracture may arise even at stresses which are fully permissible according to valid specifications. These appear to arise primarily in large parts, usually in welded structures and vessels. The danger of damage increases with increasing dimensions and complexity of shape of the body, decreasing temperatures of the material and increasing internal stresses caused by welding. In the present paper the author has studied the factor of size and the influence of internal stresses in weld joints for the purpose of determining the basic decisive parameters of the limit state of the brittle strength with regard to the shape of the body, dislocation andthe length of its welded joints. It is assumed that the part is in operation in a state in which only rapid brittle fractures can occur, i.e. that

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Limit strength states of large ...

the temperature of the material is below the transition temperature, a condition which is frequently fulfilled in normal operation.

Two main factors influencing brittle fractures from the point of view of size and shape of the body are considered; elastic energy stored in the body, particularly with reference to welded vessels and the relation of shear stress to maximum normal stress.

Conclusions reached from the analysis indicate that at low temperatures, when the possibility of sudden brittle fracture must be considered, tests carried out on small specimens of the material have no real value. Influence of geometrical factors, such as size and shape as well as internal stresses, is considerable. These factors, derived in the paper, are relative only, giving a comparison of the limiting values of brittle strength. Actual values are influenced by the constants of the material and

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E073/E635

Limit strength states of large ...

must be determined or verified from tests. To such tests scaling is applicable and it is here therefore that the geometrical parameters play their major part. Standard criteria, applicable to smaller bodies and working at normal or raised temperatures, cannot be applied to the design of large vessels operating at low temperatures, i.e. in the zone of brittle fractures. Such vessels are frequently encountered in the chemical or power generating industries. Conventional mechanical properties of the material can no longer be used when computing the safe stresses of such vessels. Internal stresses and the level of elastic energy stored in the material have a considerable influence and must be taken into account. The properties of the material are best characterised by the quantity K, kg/cm^2, i.e. the specific energy per 1 cm^2 of the fractured surface, which in metals is determined by the specific deformation energy per 1 cm^3 required to reach the limit-strength state of the material. The quantity K is a

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Limit-strength states of large ...

material constant which depends on the temperature and the velocity of propogation of a crack and, to a certain extent, on the shape of the cross-section. Comparison of test results carried out in the Soviet Union and Czechoslovakia on large specimens on which sudden brittle fracture was produced with appropriate notch-impact values, gave an average value of $K = 20\ a_k$ obtained for steel bodies at normal temperature. There are 5 figures.

Card 4/4

NEMEC, J., prof., inz., Sc.Dr.

The Scientific Conference of the Engineering Faculty of Higher School of Technology in Brno. Strojirenstvi 12 no.1:69 Ja '62.

NEMEC, J., prof., inz., dr., Dr.Sc.; TRNKA, J., inz.

Use of mathematical machines in machinery industries. Strojirenstvi 12 no.4:241-242 Ap '62.

37165
Z/038/62/012/005/002/004
E073/E335

10.7400

AUTHOR: Němec, J., Professor Engineer, Doctor of Sciences

TITLE: Study of the propagation of fatigue cracks in bodies

PERIODICAL: Strojírenství, v.12, no. 5, 1962, 346 - 354

TEXT: The influence of various factors on the spreading in width and depth of cracks is expressed by means of mathematically derived relations, paying particular attention to cases in which the material is subjected to alternate stresses. Differences in the behaviour of hard and soft materials are pointed out. The progress of the cracks is illustrated on the example of a cylindrical rod subjected to bending during rotation and a prismatic rod subjected to repeated bending. The cracks form at the surface and, during the first stage, spread predominantly inside the surface layer. When the entire surface layer is damaged they spread inwards and the depth of the crack increases progressively to a critical value. The plot, Fig. 4, shows the main stages of development of a crack. Up to a certain number of stress cycles the damage to the material accumulates in the exposed spots and manifests itself only after N_o load

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Study of the propagation ....

cycles in the form of a visible crack or cracks. Then, this crack propagates inside the surface layer and other cracks may also form there. Up to a certain, relatively large, number of cycles the depth of the damaged layer $\ell = S$ remains unchanged. When the cracks eventually interconnect and the main part of the surface layer, which is exposed to unfavourable tensile stresses, is damaged a change occurs; on reaching N^* load changes the third phase of breaking-up of coherence sets in. It was established by numerous measurements and tests that from this time onwards the relative depth of the crack ℓ/h showed a linear increase with the number of further load cycles. The crack increases up to N_{KR} cycles when a critical depth of the crack ℓ_{KR} is achieved, at which time there will be a sudden brittle fracture through the remaining cross-section $\ell = h$. The more sudden the change in load, the smaller will be the number of load cycles N^* and N_{KR} and the more rapid will be the spreading inwards. The

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Study of the propagation ....

critical depth ℓ_{KR}/h of a crack will decrease with increasing stress. On the basis of numerous results from fatigue fractures and fractures of test specimens, it was found that for soft constructional steel at normal temperatures the average work of plastic deformation required to produce a fracture per 1 cm^2 of the area of the final fracture was $K = 100 - 150$ $kgcm/cm^2$ for static loading and $K = 30 - 60$ $kgcm/cm^2$ for impact loading. An empirical formula for determining the size of the crack, which starts spreading on further cyclic loading, is:

$$\sigma^3 \ell = C ,$$

where σ is the nominal stress assumed in the calculations,
ℓ is the characteristic length (for instance, depth) of the crack.
C is a constant depending on the structure of the material, particularly on its surface layer. The quantity expressing

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Study of the propagation ....

this constant is analyzed and it is concluded that the criterion $\sigma\ell = C$ is not reliable enough for determining the stability of cracks. The author derives the following empirical relation for carbon steels:

$$\frac{N^*}{N_{KR}} \geq 0.2 \sqrt[5]{\frac{\sigma}{\sigma_c}} .$$

He concludes that the dependence of the depth of the crack or of the relative area of the crack on the number of load cycles is a complicated one, indicating the different stages of development of the crack. Therefore, the service life of components cannot be calculated from a single analytical relation and is not determined by a single material constant. Further verification and development of the calculation method will permit determining the permissible state of cracks for a predetermined increase in the number of load cycles.

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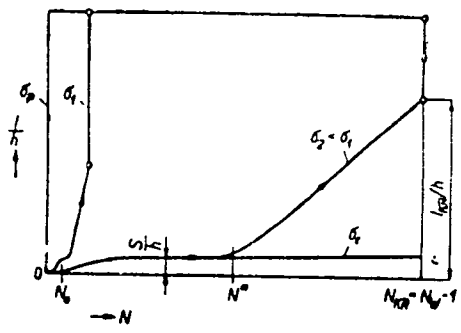
Study of the propagation ....

i.e. for a certain service life. It will also be of interest to study the control of the process of development of surface cracks by suitable surface treatment.
There are 6 figures.

ASSOCIATION: Fakulta technické a jaderné fyziky, ČVUT, Praha (Department for Technical and Nuclear Physics, ČVUT, Prague)

Fig. 4:



Card 5/5

NEMEC, J., prof., inz., dr., Dr.Sc.

Development of technical education. Strojirenstvi 12 no.10:721-722 10 0 '62.

1. Ceske vysoke uceni technicke, Praha.

KUPKA, Ivan; NEMEC, Jaroslav; STEPANEK, Stanislav

Internal stresses in making pressure vessels for nuclear reactors. Jaderna energie 9 no.5:146-155 My '63.

1. Zavody V.I. Lenina, Plzen.

Z/032/63/013/001/004/004
E073/E183

AUTHOR: Němec, J., Professor of Engineering, Doctor of Sciences

TITLE: The resistance of large parts to brittle fracture

PERIODICAL: Strojírenství, v.13, no.1, 1963, 52-55

TEXT: In an earlier paper the author showed that there is a definite relationship between the geometry of a part and its mechanical properties, and that this relationship is important from the point of view of determining the limit state. Fracture will be facilitated by low values of the elasticity modulus E and energy required for producing a unit area of the fracture K, and by high yield point σ_p and large characteristic dimension of the body L. To initiate a brittle crack in steel bodies the following conditions have to be fulfilled: a) there must be a critical notch effect α_{cr} of the initial defect or notch; b) the localised yield point must increase to reach, before plastic deformation can occur, a sufficiently high local normal stress σ_{cr}; c) the total work of all sliding actions in the exposed spot (generally the work of local plastic deformation) must be greater than the energy required to form new free surfaces of the size A_i^n in the body:

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$$\sum L_{pl} \geq KA_i^*.$$

K is composed of the local deformation work required to reach the limit state Λ_{pl} e (e - linear dimension affected by the local plastic deformation) and the energy which is required for accelerating the propagation of the crack and the development of the crack with the limit velocity v_0 for the given size of the part L and its stress state. The average value of K for the formation of a fracture of area 1 cm^2 is determined approximately from tests with large parts at a constant temperature. To facilitate brittle fracture the tests are carried out at low temperatures. The origin of the fracture will be a sharp notch and the initial stress increase as well as the acceleration of the crack propagation is facilitated by impact on a wedge inserted into the notch. Then the dimensions and the geometry of the formed crack are studied. To facilitate evaluation of the results of such tests the conditions are investigated for a specimen without internal stresses, as illustrated in Fig.1. It is assumed at first that the length of the specimen is less than its width and that a

crack has developed. The expressions derived will be generally valid if the influence of elastic deformation and of some other factors is taken into account. The critical stress for the crack to propagate is:

$$\sigma_{cr} = \sqrt{\frac{2KEL^3 - 16(\varkappa l)^2}{2.4\, l^4}}$$

where $\sigma_{cr} < \sigma_p$ and $\varkappa = P/h$ is the specific transverse force at the sides of the notch or of the crack produced by impact on the wedge. The higher the value of $\varkappa$ for a given σ_{cr}, the lower will be the necessary length l_{cr} of the crack required for it to propagate. Parts made of material with a high yield point and a low value of K are particularly sensitive to brittle fracture. The product K x E is virtually constant for any given material, whilst $\sigma_p^2 L$ is the level of the limit elastic stress of a given part of dimension L. The parameter $KE/\sigma_p^2 L$ is the ratio of the "material constant" to the specific energy of elastic stress of a body of a certain size. The higher the intensity of the impact,

the lower will be the notch effect required to achieve crack propagation. The influence of transverse shear stresses on the elastic deformation is disregarded in the first part of the analysis, but this is not permissible for long specimens for which a correction factor can be derived. The influence of transverse forces increases the size factor and reduces the limit stress. The study is based on a crack emanating from the surface but it can be modified to apply to a centrally located initial crack or north nucleus. The main purpose of the studies was not to determine quantitative formulas, but to derive basic expressions for estimating the parameters of and evaluating experimental data on brittle fracture of large specimens, and for determining the similarity laws and the basic relations governing material constants.
There are 2 figures.

ASSOCIATION: ČVUT, Praha (ČVUT, Prague)

L 11020-65 EWT(m)/EPF(n)-2/T/EWP(k)/EPA(bb)-2/EWP(v)/EWP(t)/EWP(b) Pf-4/Pu-4
SSD/AEDC(b)/AFWL/BSD JD/HM
ACCESSION NR: AP4044866 Z/0038/64/000/009/0322/0336

AUTHOR: Hauer, Josef (Khauyer, Y.); Havel, Stanislav (Gavel, St.); Nemec, Jaroslav (Nemets, Ya.); Stepanek, Stanislav (Shtepanek, St.)

TITLE: Pressure vessel of the first Czechoslovak nuclear electric power plant

SOURCE: Jaderna energie, no. 9, 1964, 322-336

TOPIC TAGS: pressure vessel, low carbon steel, nonaging steel, manual arc welding, impact strength, electroslag welding, automatic welding, nuclear power plant

ABSTRACT: A survey is made of investigations and determinations of the optimum dimensions and shape of the most stressed parts of the pressure vessel of the first Czechoslovak nuclear power plant, in particular, the cover, the bottom, and the inlet and exit flanges of the cooling gas tube. The reactor is D_2O moderated and CO_2 cooled. For a power output of 150 MW its diameter is about 5 m and altitude 20 m, and for an operating pressure of 65 at the cylindrical walls must be 150 mm thick. The pressure vessel is made of low-

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L 14020-65
ACCESSION NR: AP4044866

carbon, small-grain, non-aging steel having good mechanical properties, especially impact strength, and a minimum of permissible defects. The investigation shows that both manual arc welding and automatic electroslag welding can be successfully used for welding the heaviest parts of the pressure vessel. A program has been set up for investigating brittle hardness and the results are being checked on a model of the pressure vessel. Orig. art. has: 32 diagrams and 3 formulas.

ASSOCIATION: Zavody V. I. Lenina, Plzen.

SUBMITTED: 00 ENCL: 00 SUB CODE: NP

NO REF SOV: 002 OTHER: 00

Card 2/2

L 62160-65 EWP(w)/EWA(d)/T/EWP(t)/EWP(b) JD

ACCESSION NR: AP5019907 CZ/0032/64/014/012/0910/0915

AUTHOR: Nemec, J. (Professor, Engineer, Doctor of sciences) (Prague)

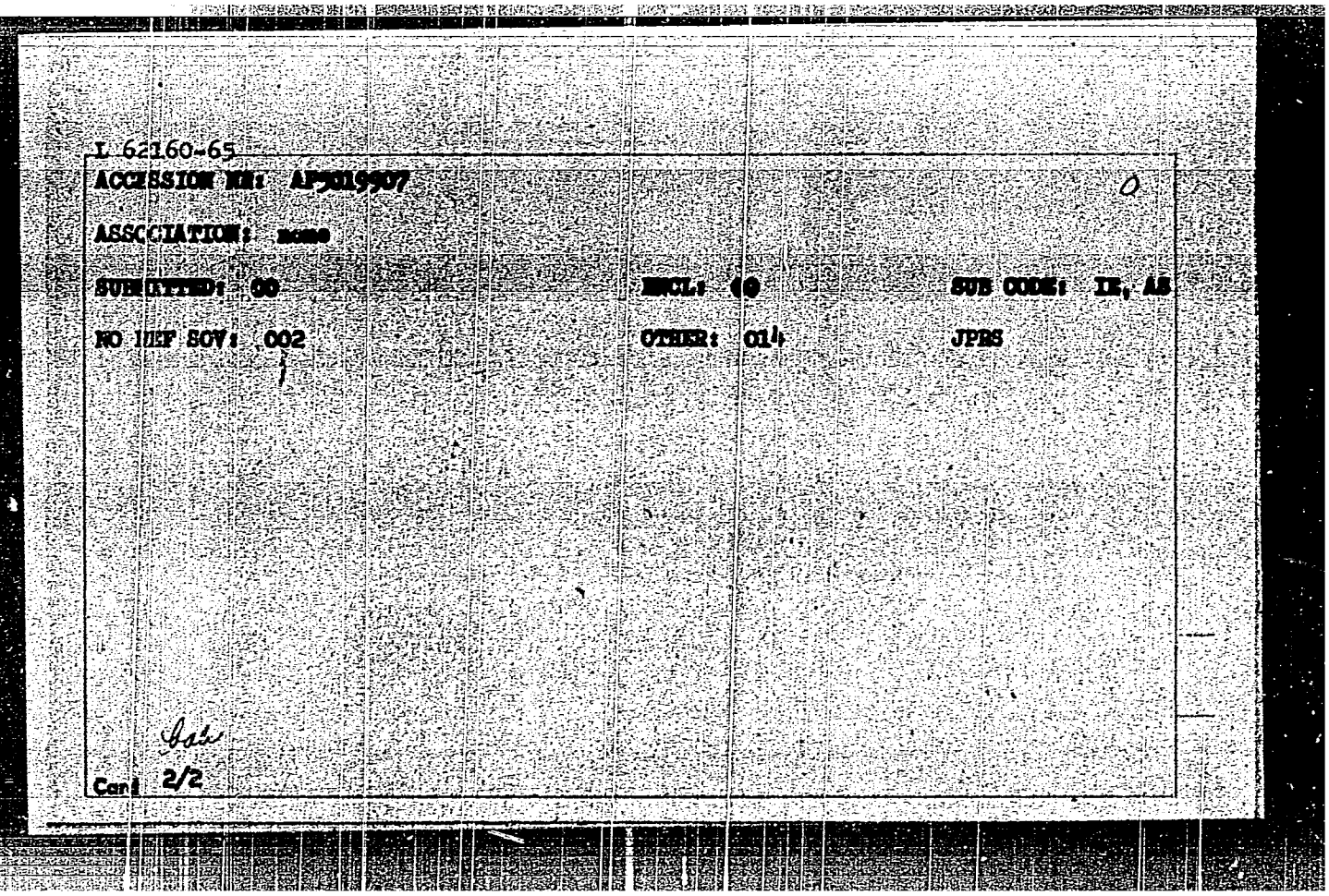
TITLE: Development of cracks in steel parts

SOURCE: Strojirenstvi, v. 14, no. 12, 1964, 910-915

TOPIC TAGS: steel, mechanical engineering, metal fatigue, metal stress, metal fracture

Abstract (Author's English summary, modified): The article analyzes the nature and mechanism of cracking in steel machine parts under repeated and fatigue stress. The study is dominated by the results of certain recent research work indicating clearly a new approach to the problem of safety and strength calculations. The new theories depart from conventional views on the effect of microscopic cracks present in the structure of material and introduce new elements into the calculation of critical strength. The conclusions indicate that some of the present methods of calculation can no longer be considered fully justified. Orig. art. has 1 figure, 11 formulas, 5 graphs, and 1 table.

Card 1/2



L 62160-65

ACCESSION NR: AP5019907

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: IE, AS

NO REF SOV: 002 OTHER: 014 JPRS

Card 2/2

NEMEC, Jaroslav, prof., inz., doktor ved.

Saving of construction materials and the quality of products.
Podn org 18 no.2: 49-52 F'64

1. Faculty of Technical and Nuclear Physics, Czech Higher School of Technology, Prague.

NEMEC, Jaroslav

Maintenance and planned checking and repair. Elektrotechnik 20 no.1:24-25 Ja '65.

1. Repair Shop of the Svit National Enterprise, Gottwaldov.

Anti-Vibration Paints

By J. B. Slavik and J. Němec. From *Strojírenství*, Vol. 1, No. 1, 1951, pp. 29-33, 7 illustrations, 5 tables.)

A series of experiments was carried out to determine the effect of several Czech-produced anti-vibration paints on the damping of vibrations, particularly those in the sonic range.

Preliminary Experiments

An experimental paint produced by one of the authors and containing suitably prepared slag wool and varnish was tested on sheets 100 cm × 67 cm (40 in. × 26 in.) and 0·5 and 1 mm in thickness. The attenuation of the sound was measured by a subjective method in a totally noiseless room, using a stop watch. To produce the vibrations, the sheets were freely suspended and a wooden ball weighing 0·2 kg (0·44 lb) was dropped on its surface from a height which was identical for all the tests. The time was measured by two observers, and in each case the average of 20 readings was evaluated. The measuring accuracy was 15 to 20 per cent. The sound level at the moment of impact of the wooden ball on the sheet was measured by a General Radio Co., Type 759-A sound level meter in decibels, the microphone being placed at a distance of 150 cm from the sheet. Three alternative paints of this type were tested and the results obtained are summarised in Figs. 1 and 2 and Table 1.

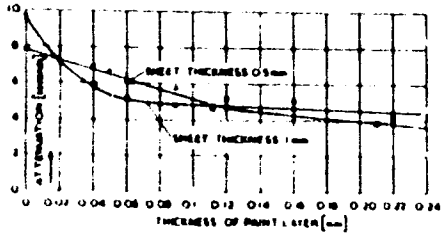


Fig. 1. Influence of the anti-vibration paint A on sound attenuation.

Anti-vibration Paint A

The results obtained are given in Fig. 1. In the case of a 0·22 mm thick paint coating, the attenuation of the sound is reduced by about 50 per cent for 0·5 mm thick sheets and by about 56 per cent for 1 mm thick sheets. In addition to the attenuation of the sound due to the impact, the attenuation of the sheet due to distortion also exerts an influence, in the case of the thinner sheets. The paint had no influence on the sound level at the instant of impact. The paint is thinly liquid and can be sprayed on.

[illegible], [illegible].

Noise in machine shops. p. 66. S[illegible]. Ministerstvo strojirenstvi, Praha. Vol. 5, no. 1, Jan. 195[illegible].

SOURCE: East European Accessions List, Vol. [illegible], no. [illegible], September [illegible]5

SZECHOSLOVAKIA/Acoustics - [illegible] 1/1

Abs Jour : [illegible]

Author : [illegible] Jaroslav
Inst : -
Title : Units and Methods for Determining Loudness of Sound

Orig Pub : Akust. Beograd, 1963, 1, No 3, 243-248

Abstract : In connection with the need for standardization of acoustic measurements, the author considers the principal units for measurement (phon, sone) and their definitions. Methods for determining loudness, phons, and sones, and numerical characteristics of [illegible] are described, along with [illegible] tolerances adopted. -- C.G. Kirkham

Card : 1/1

NEMEC, J.; RANSDORF, J.

Present problems of protection against the noise. p. 107

ZDRAVOTNI TECHNIKA A VZDOCHOTECHNIKA. Praha, Czechoslovakia. Vol. 2, No. 3, 1959

Monthly List of East European Accessions (EEAI), LC. Vol. 8, No. 9, September 1959
Uncl.

NEMEC, J.

Sound silencers and their application in silencing engine noise. p. 43

Ceskoslovenska vedecka technika spolecnost pro zdavotni techniku a vzduchotechniku, Praha, Czechoslovakia, Vol. 4, 1959.

Monthly List of East European Accessions, (EEAI) LC, Vol. 8, No. 7, July 1959. Uncl.

NEMEC, J.: RANSDORF, J.

Antivibration coatings and their use. P 521

STROJIRENSTVI (Ministerstvo tezkeho strojirenstvi, Ministerstvo vscobecneo strojirenstvi) Praha, Czechoslovakia Vol. 9, no. 7 July 1959

Monthly List of East European Accessions (EEAI), LC. Vol. 9, no. 2, Feb. 1960

Uncl.

S/274/63/000/001/005/020
D469/D308

AUTHOR: Nemec, Jaroslav

TITLE: A source of sound signals used for measurements

PERIODICAL: Referativnyy zhurnal, Radiotekhnika i elektrosvyaz', no. 1, 1963, 8, abstract 1B61 P (Czech. pat., cl. 21 a2, 10; 21 a2, 16/05, no. 100107, Jul. 15, 1961)

TEXT: The patent describes a source of sound signals with a constant rate of sound flow, independent of frequency and suitable for measurements of attenuation of sound waves in acoustical absorbers and for the determination of resonant frequencies of acoustical systems. The vibrating element of the source should oscillate with speed amplitude which does not depend on frequency. The source consists of an excitation loudspeaker (EL) and a radiation loudspeaker (RL) placed in front of it in the same compartment. The membrane of the RL is excited by the acoustical field of the EL, acting on the back of the RL membrane. The back of RL is covered so that the sound produced does not affect the measurements. The space between

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A source of sound signals ...

the front of the EL and the back of the RL is insulated. The magnitude of voltage developed across the vibrating coil of the RL may be used to measure accustical speed of sound propagation. This voltege may be applied to an amplifier with variable amplification factor and hence to the EL so that the speed amplitude of vibrations is maintained at a constant level and does not depend on frequency or on the associated acoustical medium. An example of the construction of such a source is described.
[Abstracter's note: Complete translation]

Card 2/2

S/058/63/000/003/100/104
A066/A101

AUTHOR: Němec, Jaroslav

TITLE: Mufflers and their use for silencing the noise of engines

PERIODICAL: Referativnyy zhurnal, Fizika, no. 3, 1963, 60, abstract 3Zh362 ("Sb. Českosl. věd. techn. společn zdravotni techn. a vzduchotechn. ČSAV", no. 4, 1962, 43 - 65, Czech; Russian, English French and German summaries)

TEXT: Some acoustic principles proved to be highly valid in solving the noise problem of engines or compressors, especially of their exhaust. Several designs of mufflers were therefore examined both theoretically and experimentally. Calculated data and results of measurements are presented. Nomograms are given for calculating the cut-off frequency of an acoustic filter. The methods of laboratory measurements carried out to test various versions are specified. Particular attention is devoted to a longitudinal transmitting filter and its version giving the lower cutoff frequency. This type of muffler is very useful for reducing the noise of an engine exhaust. In order to give a practical example,

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the presumable characteristics of the muffler used in the 3B110 engine are checked under operational conditions.

[Abstracter's note: Complete translation]

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001136510014-9"

HAUER, Josef; HAVEL, Stanislav; NEMEC, Jaroslav; STEPANEK, Stanislav

Pressure vessel of the first Czechoslovak nuclear power plant.
Jaderna energie 10 no.9:322-336 S '64.

1. Zavody V.I. Lenina National Enterprise, Plzen.

NEMEC, Jaroslav

Permissible noise in industrial plants. Prac. lek. 14 no.6:299-303 Ag '62.

(NOISE) (INDUSTRIAL MEDICINE)

NEMEC, Jaroslav, inz. dr., CSc.

Contribution to the design of a sound damper for ventilation ducts.
Zdravot tech 6 no.5:195-202 '63.

1. Statni vyzkumny ustav tepelne techniky, Praha.

BOLESLAV, A.; KOLMER, F.; MERHAUT, J.; NEMEC, J.; SLAVIK, J.B., prof.

Report on the 4th International Congress on Acoustics in Copenhagen, August 21-28, 1962. Slaboproudy obzor 24 no.3:183-185 Mr '63.

1. Katedra fyziky, Elektrotechnicka fakulta, Ceske vysoke uceni technicke Praha (for Slavik). 2. Vyzkumny ustav zvukove, obrazove a reprodukcni techniky, Praha (for Kolmer). 3. Statni vyzkumny ustav tepelne techniky, Praha (for Nemec).

NEMEC, Jaroslav, prof. DrSc.

Editing of higher school textbooks. Stroj vyr 12 no.10: 770-771 O '64.

1. Technical Commission of the Ministry of Education and Culture.

NEMEC, Jindrich, inz.

Measuring instruments for forming machines at the 3d International Fair in Brno. Stroj vyr 9 no.12:618-619 '61.

1. Smeralovy zavody, Vyzkumny ustav teskeho strojirenstvi, Brno.

NEMEC, Jindrich, inz.

Electronic measuring instruments for mechanical engineering at the 1962 International Fair in Brno. Stroj vyr 10 no.12:608-609 '62.

1. Vyzkumny ustav Smeralovych zavodu, n.p., Brno.

CZECHOSLOVAKIA

NEMEC, L.

J.Heyrovsky Institute of Polargraphy, Czechoslovak Academy of Sciences, Prague

Prague, Collection of Czechoslovak Chemical Communications, No 5, March 1966, pp 1162-1171

"Equilibrium conditions for adsorption measurement on mercury electrodes."

NEMEC, Josef

Effect of column pressure loss on efficiency of a vacuum still. Chem prum 12 no.4:186-188 Ap '62.

1. Chemicke zavody, CSSP, Zaluzi

NEMEC, Josef

Intensification of distillation and rectifying columns. Chem prum 12 no.8:431-433 Ag '62.

1. Chemicke zavody, Ceskoslovenske spojene podniky, Zaluzi.

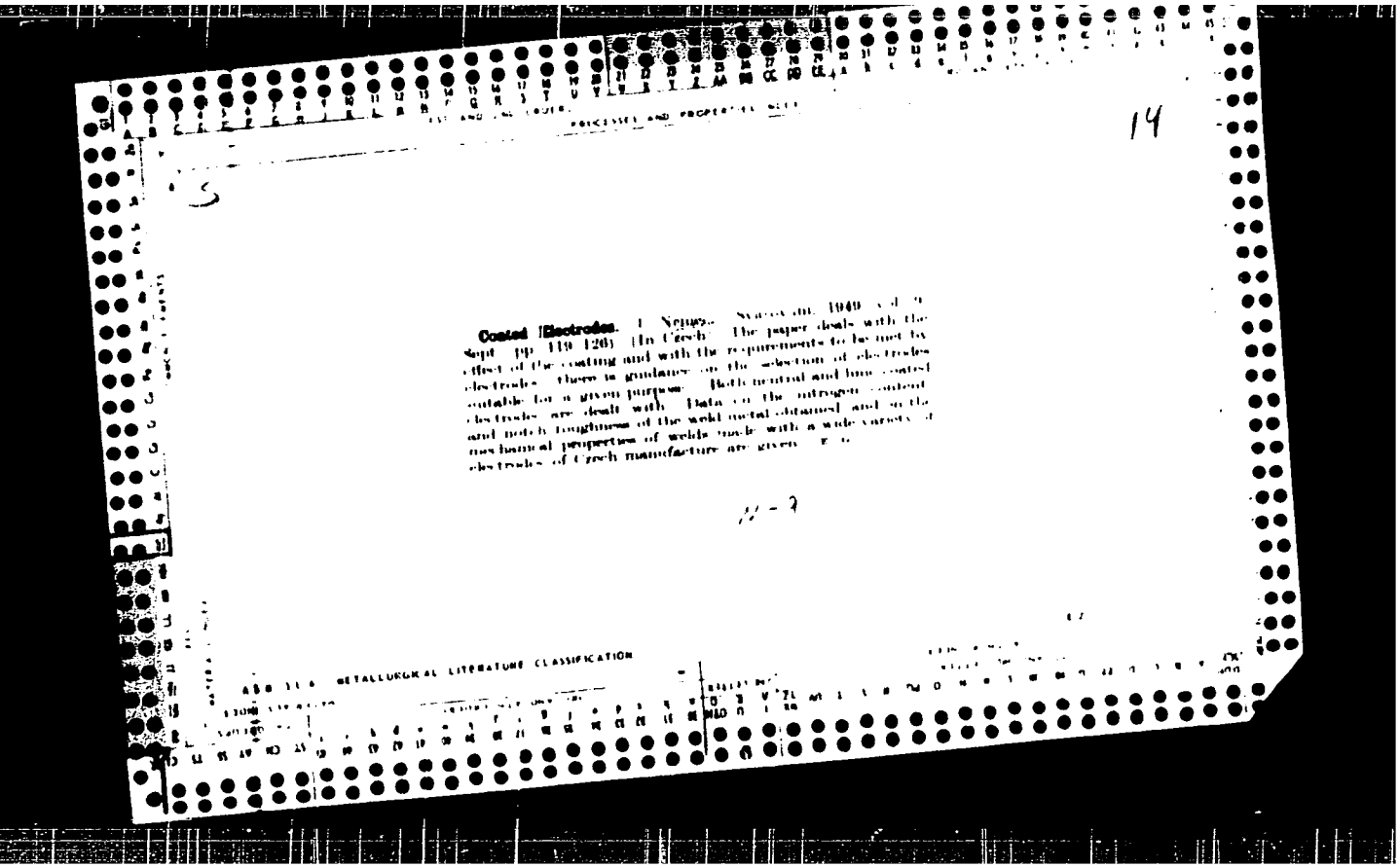
NEMEC, Josef, doc, dr. inz.

"Catalog of materials 1962; stainless steels". Reviewed by Josef Nemec. Zvaranie 12 no.11:339-340 N'63.

NEMEC, Josef

Rotary evaporator. Chem listy 57 no.10:1074-1077 O '63.

1. Laborator monosacharidu, Vysoka skola chemicko-technologicka, Praha.



14

Coated Electrodes. I. Nguyen. Svarovani, 1969, vol. 18, Sept., pp. 119-120. (In Czech.) The paper deals with the effect of the coating and with the requirements to be met by electrodes. There is guidance on the selection of electrodes suitable for a given purpose. Both neutral and lime-coated electrodes are dealt with. Data on the nitrogen content and notch toughness of the weld metal obtained and on the mechanical properties of welds made with a wide variety of electrodes of Czech manufacture are given. 6 r.

11 - 7

A66 11.4 METALLURGICAL LITERATURE CLASSIFICATION

Met Ge
1952

L -Cleaning, Coating and Smashing

921-L Notes Concerning Welding-on of Gear Teeth. (In Czech.) Josef Nem ec. *Hutnicke Listy*, v. 6, Dec. 1951, p. 586-589.

Problems connected with the use of welded (built-up) gear teeth in coal-mining equipment. Materials de posited. (L24, ST)

NEMEC, JOSEF.

Abeceda obloukoveho svarovani; zakladni prirucka pro svarece a pomucka k odbornemu vyuviku. [Vyd. 2.] Praha, Prace; vydavatelstvo ROH, 1952. 113 p. (Technicke prirucky Prace, sv. 57) [The A B C of arc welding; a basic handbook for welders and their expert training. illus., bibl., subject index]

SO: Monthly List of East European Accessions, Vol.3, No.3, Library of Congress, March 1954, Unel.

NEMEC, J.

"New information about the effect of moisture on the properties of welding electrodes." Svaranie, Bratislava, Vol. 2, No. 12, Dec. 1953, p. 387.

SO: Eastern European Accessions List, Vol. 3, No. 11, Nov. 1954, L.C.

NEMEC, J.

"Welded Cast-Iron Products." p. 245 (Strojirenstvl, Vol. 3, no. 4, Apr. 1953, Praha)

SO: Monthly List of East European Accessions, Vol. 3, No. 3 Library of Congress, March 1954, Uncl.

NEMEC, J.

"Measuring the Load on High-pressure Slide Valves." p. 804 (STROJIRENSTVI, Vol. 3, No. 11, Nov. 1953) Praha, Czechoslovakia

SO: Monthly List of East European Accessions, Library of Congress, Vol. 3, No. 4, April 1954. Unclassified.

NEMEC, Josef (welding)

Elimination of the effect of heat in welding anticorrosive chrome-nickel steel, p. 44, ZVARANIE (Ministerstvo hutneho prumyslu a rudnych bani a rudnych bani a Ministerstvo strojarstva) Bratislava, Vol. 3, No. 2, Mar. 1954

SOURCE: East European Accessions List (EEAL) Library of Congress, Vol.4, No. 12, December 1955

NEMEC, J.

New discoveries about the effect of moisture on the properties of welding electrodes. p. 361.
ZVARACSKY SBORNIK, Bratislava, Vol. 3, no. 3/4, 1954. (Svaracsky sborrdk)

SO: Monthly List of East European Accessions, (EEAL), LC, Vol. 5, No. 6, June 1956, Uncl.

NEMEC, J.

Calculation and construction of welded pressure vessels. p. 470.
ZVARACSKY SBORNIK, Bratislava, Vol. 3, no. 3/4, 1954. (Svaracsky sbornik)

SO: Monthly List of East European Accessions, (EEAL), LC, Vol. 5, No. 6, June 1956, Uncl.

[illegible], J.

Welding of thick plates in the field. p. 7.
(Zvarenie, Vol. 4, no. 1, Jan. 1955, Praha.)

SO: Monthly List of East European Accession, (EEAL). LC, Vol4, No. 11, Nov. 1955, Uncl.

NEMEC, J.

Welding alloys resistant to scoring at high temperatures. p. 63.

ZVARACSKY SBORNIK Vol. 4, no. 1, 1955

Czechoslovakia

Source: EAST EUROPEAN LISTS Vol. 5, no. 7 July 1956

NEMEC, J. - Zvaranie - Vol. 4, no. 2, Feb. 1955.

Hammer welding as a means of overcoming tension and preventing the rising of cracks. p. 41.

SO: Monthly list of East European Accessions, (EEAL), LC, Vol. 4, No. 9, Sept. 1955 Uncl.

[illegible]C, [illegible].

trength o[illegible] wel[illegible] [illegible] with vi[illegible] [illegible] p. [illegible].
(Slovenska akademie vied) Br[illegible]tisl[illegible]. V[illegible]l. [illegible], no. 2, [illegible].

[illegible]URCE: [illegible] European Accessions List, [illegible], [illegible], Sept[illegible]

NEMEC, J.

Welding compositions for use in heat. p. 13.
(Zvarovanie, Vol. 4, no. 3, Mar. 1955, Praha.)

SO: Monthly List of East European accessions, (EEAL), LC, Vol. 4, No. 11, Nov. 1955, Uncl.